

# ROCKS and MINERALS

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ROCKS and MINERALS

PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

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Edited and Published by Peter Zodac

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## Mineral Collecting in Spitzbergen

By RICHMOND E. MYERS

Collectors are funny people. No matter what they collect, if they have the time and the pocketbook, they will travel to the most distant parts of the earth in search for additional material to place in their collections. Mineral collectors are no different than any other type, but they have one advantage over the rest, no matter where they go they are able in some way or other to follow their hobby, and their sole equipment is merely a good hammer. In almost any part of the world minerals may be found. Certain regions, however, are famous for the minerals they produce, either in quantity or quality. Other regions are never heard of, yet there is always the chance that something worth seeking might be there.

Now in all my reading I have never read that Spitzbergen was a good place to look for mineral specimens. Of course I knew that coal was mined in this far away arctic place, but I never thought of taking a trip up there to pick up a piece of coal. The idea of having a piece of it for a locality specimen was all right, but to go there and get it was another thing. However, when I decided to spend some time collecting in the Norwegian localities this past summer, and heard at the same time of a cruise sailing to this remote coal mining district, the idea came to me that if coal was there, why not other minerals? I could find little information concerning anything else than coal in Spitzbergen, but I remem-

bered that when new at this business of collecting, the mine dumps in Pennsylvania's anthracite region were avoided simply because there was "nothing there but coal," and eventually upon visiting these dumps I came home with quite a few interesting minerals including Lansfordite. I decided therefore to visit Spitzbergen and to have a look over the place at any rate. This decision made, my friends did their best to talk me out of it. The idea was ridiculed. "What on earth do you want to go to Spitzbergen for?" That was the usual reception of the news that I was going. Even Mrs. Myers who accompanied me was not at all sure just what appeal the place did have, but with the spirit of one who loves travel, she agreed to take the cruise.

Frankly, before going any further, let me say that from the viewpoint of a mineralogist, we really did not make any great "finds," nor did we secure many varieties of minerals, but what we found was good, and it was not limited to coal. I feel that it will be of interest to the readers of ROCKS and MINERALS to hear about our experiences, and I shall also try to tell you a little bit about this outpost of Norway of which the world in general knows but little.

To begin with Spitzbergen is one of an arctic archipelago that lies approximately between latitudes 77 and 80 degrees north and between longitudes 10 and 30 degrees east and is known by

the name of Svalbard. Actually this name applies to all of the Norwegian islands in the Arctic Ocean. Spitzbergen proper is the largest of all of these. It was known to the Norwegians by the end of the twelfth century, but later seems to have been forgotten. The islands were rediscovered in 1596 by a Dutchman named Barents. Whaling soon became an important activity, and as a result England, Holland, and Norway became involved in a dispute over the islands. This industry however seemed to die down for a time, and the matter was dropped. Early in the seventeenth century, the Russians appeared upon the scene looking for fur, and later the Norwegians returned, and the Russians gradually withdrew, leaving the Norsemens in possession. The discovery and mining of coal brought the matter of ownership to a head once more and finally in 1920 a conference settled the matter by giving the islands to Norway, with the exception of a small area which was held by Holland, and recently sold to Russia.

Spitzbergen has been the base of a number of Arctic expeditions, not only on the part of the Norwegian government, but also by other nations. In recent years it has served as an air base for Amundsen, Ellsworth, and Byrd in their various polar flights. This past summer the Russian government used it as a base for their ice-breaker, the "Sadko," which is attempting to find a feasible commercial route between Asia and Europe, via the Arctic Ocean.

Although far up in the polar regions, Spitzbergen's climate is not severe in the summer time, hence collecting does not have to be done with parkas and snowshoes as some people might believe. The Gulf Stream reaches up towards these islands, and brings warm waters along the west coast of Spitzbergen. Were it not for this factor, it would be impossible for vessels to reach these northern outposts even in the summer time, and the West coast would be like the East coast, ice-bound the year round.

Generally speaking the whole of Spitzbergen is mountainous country, with large areas covered by glaciers similar to those of Greenland, and extending down to the sea. The highest regions are in the north and east, and here the mountains have a wild and

twisted appearance. In the south-westerly portion of the island, the rocks are mostly sedimentary, and lie in long horizontal strata, making a beautiful sight. It is here that the coalfields are to be found. These deposits represent considerable mineral wealth, and to date their full extent is doubtful, but there is no doubt that they represent billions of tons, and may in the future become of untold importance to northern Europe.

The majority of the mines are located along the Isfjord. The coal beds lie on the tops of the mountains, and it is necessary to construct overhead trolley buckets to bring the coal down into the valleys from the mines. The bulk of these mines are Norwegian. Their equipment is old and quite out of date. Wooden machinery is even used, and the mines as a whole present a forlorn, dilapidated appearance. The mining town at Adventfjord (Longyearbyen) is the epitome of all the bituminous mining towns of our own coal fields. When one considers that the miners have to spend the winter here, and that there is practically no sanitation, it is little wonder that the mortality is high. The only thing they have in abundance is fuel and ice. Six months of darkness in those dilapidated wooden shacks (even this wood had to be imported) is no thought to dwell upon. Only the hardy can survive it, so only the hardy are sent there. The miners are recruited from the northern part of Norway, and sent to the mines for three years. To induce them to go, there are no taxes in Spitzbergen. American cigarettes may be purchased for the equivalent of three or four cents per pack. The bulk of the mining is done during the long winter months, and the shipping takes place during the summer when there is continuous daylight and open water.

There are few women in the towns, and most of the men live in large barrack-like bunk houses, eating in a community dining room, although some families do maintain separate residences. One store and a church administer to the social and spiritual needs of these people, as the store is the gathering place much like "Tomkins Corners."

With regards to the Russian mines, everything is different. Modern and up-to-date in every respect, clean and sanitary, with the best type of mining

machinery and equipment, one almost might think he were stepping into a different world as he left a Norwegian mining town in Spitzbergen and wandered down the fjord into the Russian's camp. Here the workers look happy and gay, they actually seem to be enjoying themselves, whereas back on the Norwegian side the folk seem quiet and hushed as if they were carrying heavy burdens in their hearts. When one considers that these Russians have simply been sent up there, having nothing to say about it at all, and the Norwegians volunteered as it were, to become residents of the arctic, well, all I can say is that it speaks well for the U. S. S. R.

However, I am wandering from my original purpose, and that was to tell you something about collecting minerals in Spitzbergen. The island is of far more interest geologically than mineralogically. The sedimentation and glaciation offer excellent fields for the stratigrapher to study and admire. The paleontologist also may enjoy hours of collecting in the vicinity of the coal beds, and prove beyond a doubt that tropical flora once flourished there, but the mineralogist must bide his time and be patient, for specimens (coal excepted) will not fall into his lap.

Generally speaking little of the island's potential mineral resources have been surveyed. Much is under ice, and therefore unknown. This is quite similar to Greenland. However, the general character of the rock under the ice is fairly well assumed, and it is not beyond possibilities that minerals may be there. Outside the coal, the only mineral ever mined in Spitzbergen, has been zinc. Sphalerite was found in some quantity in the Bell-sund district, but the mining never paid. However, good specimens of zinc ores are to be found there. These include Calamine and some Smithsonite, and it is said that Zincite in tiny particles occurs in the mines. Most of these are merely prospect holes. I have not visited the locality, and merely pass this information along second hand.

Iron is found more or less everywhere. It is mostly Limonite, and can be found in surface boulders in the moraines. Some Hematite is to be picked up, but the Limonite is the

chief ore. I even found a well formed Limonite-geode in the waste material of the Adventfjord coal mines. None of the iron deposits have ever been worked commercially, but probably could be if needed.

The presence of iron is evident in large quantities of Jasper, the deposits of which are best seen at Ny-Alesund, not far from the ruins of Amundsen's hangar. Here the waters from the ice above have cut deep gulleys through much alluvial material, and exposed Jasper deposits in the sandstone which forms the base on which the alluvium rests. This Jasper runs from the red to the brown varieties. The sandstone itself is of a distinct green color.

Quartz of course is fairly common, but good crystals are rare. They may be found in gravel pockets however, well shaped, but often stained with rusty iron impurities. Drusy Quartz is the commonest type of crystallization, and may be found in most of the coal dumps.

Very fine specimens of banded rocks may be found in the King's Bay district, which show excellent foldings and frequently small fault planes. These may well be used for classroom examples of structural formation. Along the shore of the fjord near the Russian coal mines, one may find hundreds of angular pieces of sandstone, many in the form of rhombs or squares, so well shaped that they almost might have been cut by hand. These peculiar little slabs (as a rule no larger than two by three inches) frequently were decorated with fossil plants or animals, which made them all the more interesting.

I shall not bother listing ice as one of Spitzbergen's minerals. Suffice to say, that my findings and takings were confined to the above mentioned items. I admit they are not very showy, nor exactly rare, but the pleasure of hunting around in the glacial debris and mine dumps of this arctic wonderland, where the sun never sets in summer time, was ample compensation. We did not come back empty handed by any means, and I would not hesitate to recommend a similar journey to another collector who might feel inclined to pick up minerals as close to the North Pole as it is possible to do so.

## A Mineralogical Trip Through Northern New York

By WILBUR J. ELWELL

During the latter part of October, 1935, the writer, accompanied by T. Lipton Smith, both from Danbury, Conn., made a hurried trip through northern New York visiting some of the interesting mineral localities prevalent there. Unfortunately we had only five days at our disposal and in order to keep up to schedule it was necessary to drive at night often over rough roads and through unfamiliar territory. We were fortunate, however, in having good weather. It was not possible of course to visit many localities and in order to take them all in, at least the more important ones, we plan to make yearly trips visiting new localities every year; this was our second trip.

We left Danbury early on the morning of October 20th, Sunday, heading northwest for our first destination the Herkimer County quartz locality at Middleville about 125 miles away. We found the locality was alongside the State highway, in fact it was an open-cut made when the road was put through some years ago. The crystals were plentiful; some were lying loosely on the ground while others were imbedded in the outcropping sandstone. The crystals ranged in size from tiny ones up to those 3 inches in length and all were of excellent quality though the smallest ones were the clearest and most perfect in form. A man residing nearby has bags full of the crystals which he hopes someday to sell. Crystals are also common in the beds of a nearby river and in brooks where they have been washed in.

Our next objective the 2nd day was the glaucophane locality at Natural Bridge, about 80 miles further to the northwest and which is in the eastern part of Jefferson County. On arrival in the village, we found to our regret that the locality was some distance off the main highway and not having much time to search for it we decided to leave this for next year

Fifteen miles further northwest, in the northeastern part of the same county, Jefferson, is Antwerp, made famous by the Sterling iron mine. The mine has long since been abandoned but its old and extensive dumps still yield many interesting specimens. We made only a brief stay but collected many fine specimens of calcite, hematite and millerite.

The brown tourmaline crystal locality near Gouverneur, about 15 miles northeast of Antwerp and in the southern part of St. Lawrence County, was our next destination. Unfortunately, the locality could not be found. We continued 5 miles further to the northeast, to Richville, where a large limestone quarry rewarded us with many fine specimens of oligoclase, quartz crystals, phlogopite, titanite, tremolite and a number of others. Two huge dumps here will reward any collector who may search over them for minerals.

South Russell, near Edwards, about 7 miles southeast of Gouverneur, also in St. Lawrence County, produces the rare mineral danburite (named after Danbury, Conn., where specimens were first found). This locality was visited the 3rd day. The occurrence is an outcrop which is hard to find and is on the farm of a Mrs. Ellsworth,, the daughter of the late Chas. Buskirk as mentioned in Dana's *System of Mineralogy*, 6th edition, p. 1065. The locality is about exhausted as we were able to collect but a few specimens. This was our second visit to the locality.

We tried to visit the large zinc mines in Edwards, where the ore mined is sphalerite, but were refused permission to go on the dumps and so no specimens could be collected. Another zinc mine was at Fowler, not far away, but in view of our experience at Edwards we figured it would be better in not visiting it.

Perhaps the best localities for minerals in northern New York are the

talc mines at Talcville, near Gouverneur. Here we found lots of lilac hexagonite, talc pseudomorphs after enstatite, enstatite, and talc.

Fida Scott feldspar quarry at Fine, 6 miles southeast of Edwards, still in St. Lawrence County, yielded good aragonite and orthoclase crystals and cleavable orthoclase. This is an abandoned quarry and has not been worked for some time. It is some distance from the main road but we had no trouble in finding it. There is another locality near here where good specimens are obtainable but we did not visit it—saved it for another time.

We spent one whole day viewing the scenery of the Adirondack Mountains around Tupper, Saranac and Placid Lakes—then on to Port Henry on Lake Champlain, in the southeastern part of Essex County. Around Port Henry we saw lots of rose quartz on many porches but we did not stop to inquire as to the source of the mineral as we had no time to look up the locality.

The first locality visited on the 4th day was at Mineville, 2 miles northwest of Port Henry, the home of the largest magnetite mines in America. Here we examined many huge dumps and collected some interesting magnetite crystals on dump No. 21 of the Sanford ore bed.

From Mineville to Crown Point, 5 miles south of Port Henry, are hundreds of magnetite and graphite mines whose many dumps would take some time to examine but we did not take time to collect any specimens.

An occurrence for rock crystals somewhat similar to that at Middleville is at Diamond Point on Diamond Island in Lake George, about 40 miles south of Port Henry. We tried to visit the locality but could not obtain permission to do so; the island is part of a private estate of a Glens Falls, N. Y. lady.

Our next and final visit made on the 5th day was in Massachusetts at the old abandoned limonite mine in Richmond Furnace (about 80 miles south of Port Henry) where limonite and richmondite were collected. From here we headed further south for Danbury, about 50 miles further, where we arrived late Friday, October 24th.

The trip was a very successful one. We visited a number of localities that were new to us; collected many fine specimens; which together with the nice weather, no accidents and delightful scenery, makes us long for 1936 when the trip may be repeated. The total distance covered during the trip was 900 miles.

## Cosmopolitan Specimens

By PETER ZODAC, *Editor Rocks and Minerals*

On September 8th, 1935, Mr. Emmet Doherty of Peekskill, N. Y., picked up a specimen at the abandoned Gillette pegmatite quarry, Haddam Neck, Conn., and presented it to the writer who was present. The specimen was fairly large, 3 x 4 x 4 inches, but at one end, in an area just 2 x 3 inches, 8 different species of minerals were later noted. In view of the fact that two of the species, quartz and tourmaline, were present in two and three varieties respectively, the specimen is of more than passing interest and its minerals are described briefly below:

**Albite**—white and massive and as small glassy crystals.

**Beryl**—greenish-white broken crystal.

**Cookeite**—as small, yellowish globules on quartz crystals.

**Lepidolite**—small, pale pinkish plates.

**Limonite**—yellowish-brown stains.

**Muscovite**—small, silvery-white plates.

**Quartz, var. Rock Crystal**—small glassy crystals.

**Quartz, var Smoky**—massive and as crystals 1 inch long.

**Tourmaline var. Achroite**—dainty gemmy colorless crystals.

**Tourmaline var. Green**—small gemmy crystals.

**Tourmaline var. Rubellite**—dainty gemmy pinkish crystals.

The specimen could not be trimmed down because of danger to the crystals present.

## Collecting Minerals on Vacation

By ELMER N. ANDERSON

On July 14, 1935, we (Mrs. Anderson, Dean 12, Jeanette 10, Jimmy 8 and I) started out on a vacation trip, which was to take us to interesting points in South Dakota, Wyoming, Utah, Nevada, Idaho, Montana, North Dakota. We were prepared to collect minerals with a copy of Dana's Mineralogy, cloth bags and tags, prospector's hammer, trench shovel, colored pencils and plenty of enthusiasm.

The first day's journey brought us to Chamberlain, S. D., on the Missouri River. This famous stream had risen five feet since morning due to the water from the cloudburst around Fort Peck Dam a week previous. It was a wild, turbulent, churning torrent and so muddy the water looked like thick cream.

Monday morning we headed for the Badlands of South Dakota, which we had seen the year before but wanted to see again, and then to Keystone in the Black Hills, via Rapid City and the Stratosphere balloon bowl. Here we looked up Miss Hesnard, a real enthusiast on mineral collecting, who conducts tours through the famous mines of this district. Anyone interested in seeing the mines of this district will do well to look up Miss Hesnard and take the tour. Specimens of minerals found in each mine are given free to everyone taking the trip. We journeyed once more to the Etta and Hugo mines to look for more and better specimens than we got last year and were rewarded with a fine section of a spodumene crystal, about two inches in diameter and eight perfect sides—good specimens of lithiophilite, feldspar, black tourmaline and tourmaline schist, mica in its various forms, yellow lepidolite, and a specimen showing manganese oxide in a series of veinlets resembling a fossil fern. This is a wonderfully rich locality to collect a large variety of minerals and rocks.

In the evening we drove up to the Rushmore Monument to see the progress that had been made in a year's time. Last year only Washington's head was finished but this year part of the bust of Washington had been

carved and the face of Jefferson, the next figure in the group, was well outlined. This is a remarkable piece of work and well worth a long trip to see.

After a pleasant drive across the hills Tuesday morning, we arrived at Custer, S. D. and enjoyed a very nice visit with Mrs. Scott looking over her bountiful supply of rocks and minerals, rose quartz and Black Hills gold jewelry. Mrs. Scott generously turned the children loose in a box of small specimens to make their own selection, which made it a great day for them. Selecting a few specimens for ourselves, including two nicely terminated tourmaline crystals, a fine specimen of actinolite and a piece of gem quality rose quartz, we bid Mrs. Scott goodbye.

Continuing on our way to Wyoming we reached Casper after passing through extensive oil fields. This is truly an oil town with refineries everywhere and the Casper mountains almost at the south edge of the city. A picnic supper in the mountains at a waterfall and a pleasant evening with our friends, Mr. and Mrs. Paul Lang and family, ended another perfect day. The specimen from this locality is a section of the oil bearing sand rock from a diamond drill core, three inches in diameter, presented to me by friend Paul.

Stopping in Rawlins for lunch, Wednesday, we saw a wonderful display of cut and polished moss and picture agates in the window of I. E. Todd, jeweler. The display was so attractive and fascinating we stepped inside to see more of them and met Mr. Todd, who, after learning of our hobby and interest in his display, brought out additional specimens of more value, mounted and unmounted. Mr. Todd cuts and polishes his own agates and other gem stones and his specimens show that his workmanship is of the highest order. Mrs. Anderson purchased a fine specimen Mr. Todd had mounted for a breast piece and after receiving directions to get to a place where many moss agates are found we resumed our journey. Arriving at the

home of the elderly gentleman Mr. Todd referred us to, we found him gone. The place was twenty miles off the highway and we would have gone by ourselves but it took a special high wheel car or a horse and buggy to get there and we were all very much disappointed to have to pass up this opportunity. We continued on and arrived in Salt Lake City in time to see the Mormon Tabernacle and Temple in the evening.

Thursday morning we turned south for Las Vegas. Near St. George, Utah, we selected a piece of lava from an ancient flow along the highway and in a cut on a hillside we dug out some slabs of gypsum about one inch thick. There were numerous layers of this material in the formation from one quarter to one inch thick. The remainder of the drive to Las Vegas was across the Mohave Desert and a new experience to us, although we didn't find it near as bad as we had heard it would be.

Friday morning we drove out to Boulder Dam, thirty miles from Las Vegas. Much has been written about this great project so I will just say here that the dam proper is finished and work on the power house is progressing at a rapid rate. The rock far below the river bed and in the canyon walls is a volcanic breccia or tuff cemented into a solid mass through the many thousand of years since it was built up by numerous eruptions.

After seeing Boulder Dam in Black Canyon we started back north and arrived at Zion Canyon National Park in the afternoon. This is a very beautiful park, especially when the canyon is in shade and tops of the huge many colored rock masses are bright in the sunshine. On the way out the road climbed back and forth up the side of the canyon and then into a tunnel parallel with the canyon wall. Portals were cut from the tunnel to the canyon wall for observation points where one can stand and admire the vari-colored rock in many forms beyond him. On emerging from the tunnel we encountered a heavy sun shower with rain drops, it seemed, as big as marbles. The downpour changed the texture of the rock for a time, giving it all a silvery sheen and making the whole more beautiful than before and with hundreds of tiny water falls and cascades tumbling down.

Saturday morning, driving to Bryce Canyon, we first entered Red Canyon which is a remarkable area by itself and the rock of the canyon walls is truly red. Bryce Canyon holds the ultimate in weird and magnificent rock formations and coloring. It has its natural bridge and countless spires which Dean described as just like a city with many totem poles.

On our way back toward Salt Lake we stopped at an abandoned mine near Marysville, Utah, and selected two pieces of almost pure white Bentonite from a stock pile. I intend to saw out a cube of this material, soak it in water and see if it will react to swelling as some varieties do.

Swinging west toward Bingham we passed through Copperton, a small city where the officials and foremen of the mines live. The unique thing about this place is that all the houses are somewhat uniformly built, having copper roofs and other trimmings. We next passed a long low building where copper is recovered from water from one of the copper properties. Water is distributed over the hillsides by means of perforated pipes and percolating down through the ore bodies, picks up a limited amount of copper. The water is collected in tunnels below and conducted down to this building where it is passed over scrap sheet iron and iron turnings. An exchange takes place, the copper replacing the iron after which the scrap is collected and smelted.

We next enter Lower Bingham and then Upper Bingham, a typical but quaint mining town, with its one long narrow and steeply inclined street leading up to the greatest of all copper mines, the Bingham Mine of the Utah Copper Co. The general run of ore mined here is a gray light weight rock, running about 1% copper, but here and there on the different terraces can be seen the green copper carbonate, the result of water action on the ore. Occasional pockets of a higher grade peacock ore together with pyrites are found which make very nice specimens. The property was operating at only 18% of capacity at the time we were there and the watchman allowed us to enter the mine and walk along one of the terraces and select our own specimens. We also purchased a few specimens from some of the children living near the mine

who picked us out as likely prospects, and I will give them credit for being high pressure salesmen. On the way up to the lake we passed numerous ore treating plants and smelters and after an evening at the lake we returned to Salt Lake City.

Sunday morning was spent in Salt Lake and then we headed for our destination in Idaho, crossing the Snake River Desert and along the Big Lost River by the Lost River Mountains. This is one of three rivers which disappear into the lava beds east of Arco, Idaho. North of Mackay we passed close by the highest point in Idaho, Mt. Borah, and shortly before we reached Challis the road took us through a beautiful section called the miniature grand canyon.

Monday morning, following a trail along the Salmon River to Clayton and then up Squaw Creek, we reached the summer camp of our friends, Mr. and Mrs. Cornie J. Sullivan. Here we made our headquarters for four days while gathering many nice silver, lead, copper and gold ore specimens while the children had a great time fishing for trout and riding horseback. I want to mention a piece of mineralized petrified ore presented to me by Mr. Jerry Sullivan. This piece is eleven and one half inches long and weighs one and one-half pounds and runs 300 oz. of silver and 3 oz. of gold to the ton. Tons of this ore were removed from the Bert Livingstone Mine years ago and sent to the smelter, and specimens are now difficult to obtain. I prize this specimen more than any I have.

About 20 miles down the Salmon River from Clayton and a few miles off the main trail is a petrified forest. It would be impossible to find this place unless guided to it and it is known to only a very few of the local people. We obtained a number of specimens from this place.

Not far from Challis, near Drake's Ranch, is a location called Specimen Hill, where a curious form of rock is dug from the soil. It is found in the form of dimension lumber, boards 1" thick 3" to 12" wide and up to 12 ft. long, various lengths of 3" x 3", 4" x 4", 6" x 6", and 8" x 8". I was told that geologists have considered this the work of man at some remote period.

Our visit with our friends passed all too rapidly and on Friday morning we followed the trail and highway up the Salmon River to Redfish Lake, a beautiful scene with the snow capped Saw-Tooth Mountains in the background, then south and east to "Craters of the Moon" National Monument.

This is a weird and uncanny place, the lava having taken shape, in cooling, of everything imaginable. It was a hot day when we were there, giving the impression that the lava had not completely cooled off. This lava flow was comparatively recent, having occurred 500 to 1000 years ago. Before entering the boundary of the Monument we gathered a number of lava specimens of various forms, like molasses candy, bread crust, broken and honey-combed bombs.

The next day, Saturday, we crossed the continental divide again into Montana, arrived at Butte and the copper mines. We found only two mines operating and obtained some nice specimens of both copper and zinc ores from the "Anselmo Mine," an Anaconda property. Ore from the mine is shipped by electric train to Anaconda, Montana, for smelting and the zinc concentrates are shipped from Anaconda to Great Falls for refining.

Sunday afternoon we arrived at Fort Peck Dam, not far from Glasgow, Montana. This is another tremendous project and the work on the dam, tunnels, gates and spillway covers a large area. It is a very important step in the flood control program of the Government and I believe the results will be easily noticeable even after the Missouri joins the Mississippi.

Monday we turned south and cut across country to Miles City, visiting a friend on the way. We did this so that we could follow the Yellowstone River back up to Williston and look for moss agates. We stopped at numerous places at gravel deposits and found many agates but nothing of any value.

At Crosby, North Dakota, my brother had two petrified stumps from the Badlands of North Dakota waiting for me, but by this time we were so loaded down with rock we could take only one. We hope to get the other one and several others by freight later on for our rock garden.



Stopping with relatives at Steele, North Dakota, we visited a range of hills to the north of us. On one hill only, of this range, are found innumerable shells of various descriptions, evidently Ordovician Mollusca. I haven't had the specimens positively identified so I cannot name them definitely. The peculiar part is, the shells are found no where else in this range of hills and from a short distance the

hills all look alike. We were presented with an Indian Hammer at this place which was the last specimen of the trip.

We arrived home on Saturday night, August 3rd, after an absence of three weeks, glad to be home again, but well satisfied with the whole trip. Not even a flat tire marred a day's journey and with the load of rock we brought back we were fortunate in not having blow-outs or broken springs.



Photo by Stanley

Courtesy Colorado Mountain Club

Capitol Peak, 14,300 feet high, in the Elk Range, Colorado



# Minerals of the District of Columbia and Vicinity, With Pertinent Bibliography

By DR. TITUS ULKE

## PART TWO

### ADDENDA and CORRECTIONS

(of the January issue)

In the 5th paragraph of the Foreword change 125 to 136 and 85 to 91. On p. 8, 1st column, l. 30, change 85 to 91 and 40 to 45.

P. 9, under **Calamine**, add: "With sphalerite and smithsonite near New Windsor, Carroll Co., Md."

P. 9, after 17, **Calcite** and its occurrence insert: "18. **Carrollite**. Found at Finksburg, Carroll Co., Md."

Change 18 before **Cerussite** to 19, 19 before **Chabazite** to 20, and 20 appearing before **Chalcantinite** to 21.

After **Chalcantinite** and its occurrence insert the following paragraph: "22. **Chalcocite**. Occurs at Bare Hills, Dolly Hyde Mines and Mineral Hill in Carroll Co., and Roop Farm in Frederick Co., Md."

Change 21 before **Chalcopyrite** to 23 and 22 before **Chromite** to 24. To the occurrence of **Chromite** should be added: "(Bare Hills and Soldiers Delight). New Lisbon, Carroll Co., and near head of Seneca Creek, Montgomery Co., both in Md."

Before 23, **Chrysolite** insert: "25 **Chrysocolla**. In red sandstone between Middleburg and Big Pipe Creek, Carroll Co., Md. As crusts on rock in D. C."

Change 23 before **Chrysolite** to 26, and 24 before **Copper** to 27. After the occurrence of copper add "Catoctin Mtn., Frederick Co., Md."

Change 25 before **Cyanite** to 28 and 26 before **Datolite** to 29.

#### 30. **Deweyite**. **Gymnite**.

As an incrustation on serpentine at Bare Hills near Baltimore, Md.

#### 31. **Dolomite**.

As granular or dolomitic limestone occasionally in loose cobblestones and transported gravel. Quarried in Baltimore Co., Md.

#### 32. **Enstatite**. **Bronzite**.

Enstatite (including bronzite) is a

common constituent of the serpentine and peridotites of the vicinity of Washington.

#### 33. **Epidote**.

Epidote associated with hornblende and quartz was obtained in Georgetown. As a constituent of the rock epidosite (see Bibl., Merrill, B.), this mineral occurs in very minute crystals in a vein which crosses the New Cut road a few rods east of Foundry Branch. The rock is very fine grained and of a yellowish-green color, and is frequently associated with massive quartz, prochlorite and ilmenite. A similar vein was passed through by the tunnel at Champlain Avenue. In curved columnar forms the epidote occasionally occurs imbedded in the prochlorite, in crystals sometimes 10 centimeters long and 5 to 6 millimeters in breadth. They are usually broken several times transversely, and the fractures have become filled with prochlorite. The finest crystals were found imbedded in the quartz veins of amphibolite which had been thrown out from the tunnel at Rock Creek. They are about a centimeter in diameter, in well defined 6-sided prisms, and are of a dull greenish-brown color. Owing to the toughness of the surrounding material, the crystals are badly fractured and without good terminations.

#### 34. **Fluorite**. **Fluorspar**.

Often occurs with magnetite, pyrite and calcite at Woodstock, Va.

#### 35. **Galena**. **Galenite**. **Lead Glance**.

With siderite on dump of old Kirk mine workings, above Great Falls, Virginia. Galena and sphalerite occur on quartz at Glen Echo, Maryland. A large chunk of float galena was recently dug up along Constitution Avenue and 22nd Street, Southwest, in this city.

36. **Garnet**. **Almandite**, **Grossularite**, **Hessonite**, **Andradite**, **Pyrope**, **Spessartite**, **Uvarovite**.

The variety **almandite** ( $\text{Fe}_2\text{Al}_2\text{SiO}_6$ ) is occasionally found in the crystalline schists and limestone. A vein of

garnet and quartz was discovered in some granitic diorite in the District. Large dodecahedral crystals of a reddish-brown garnet occur in a garnetiferous gneiss along Sligo Creek near the Kensington Mica Mine.

### 37. **Glauconite.**

Abundant in the "green sand" or shell marl of the Coastal Plain. In shell marl of the Eocene period near Brooke's Station, Maryland, and exposed in the gorges of Henson's and Tinker's Creeks.

### 38. **Goethite.**

In cavities in limonite or hematite near Muirkirk, Md.

### 39. **Gold.** Native Gold.

In quartzitic seams and iron-stained veins in decomposing schist and gneiss; often found as octahedral crystals, dust and fine grains, in the vicinity of Great Falls and Potomac, Maryland. A few dollars worth of gold per ton is usually contained in the local iron pyrites. Some alluvial gold, in the form of small nuggets and grains, has been obtained in the gravels and stream sands of the valleys of the upper Potomac in Virginia as well as Maryland. Native gold in quartz was found in the Huddleston Mine near Bethesda, Maryland.

### 40. **Gypsum.** Selenite.

Occasionally in small pockets in beds of marl and sandy loam. Fine crystal aggregates and twinned rosettes, several inches across, were obtained at Fort Washington, Maryland, by Thos. H. Mearns and the author.

41. **Hematite.** Specularite. Specular Iron. Red Ocher. Kidney Iron. In bands and pockets in the ironstone strata of the Potomac formation of the Coastal Plain and also in baked Triassic shales at Dickerson, Md., and Goose Creek, Va. Was formerly mined at Springfield and Carroll mines near Sykesville; Mineral Hill mine near Louisville; and Patapsco mines at Finksburg, Md.

### 42. **Heulandite.**

Heulandite occurs in minute rhomboidal prisms from 1 to 2 millimeters in diameter coating the surfaces of natural joints or in small cavities in prochlorite in the District. So far as examined, the crystals present no unusual forms, and are of a grayish or yellowish-gray color with the characteristic pearly luster. (See Bibl., Merrill, B.) Heulandite, in pinkish-

white crystals, on altered diorite, was collected by Merrill in this region.

### 43. **Hypersthene.**

In gabbro near Falls Church, Virginia.

44. **Ilmenite.** Menaccanite. Titanic Iron.

In thin curved plates interlaminated with quartz or prochlorite in the Foundry Branch tunnel. The plates are from 1 to 2 mm. in thickness and an inch or more in diameter, and are usually associated with prochlorite, epidote and quartz. (See Bibl., Merrill, B.) Langdale found thick plates of titanite iron on quartz in the district near the Chain Bridge.

45. **Kaolinite.** China Clay. Kaolin. Potter's Clay.

Ordinary kaolin is found in the District, frequently as the result of the decomposition of the feldspar of granitic and gneissoid rocks. The Potomac Terra Cotta Company's pits expose Cretaceous clay of the Potomac Formation.

46. **Labradorite.** Soda-Lime Feldspar.

Found with pyroxene (diabase) in gabbro, as in quarries near Falls Church, Virginia.

### 47. **Laumontite.**

Commonly occurred as masses of imperfect crystals associated with calcite in narrow veins in the mica or hornblende rock in the Waterworks tunnel. Also in 4-sided prisms with oblique terminations in geodic cavities in calcite veins. The best crystals are about 1 cm. long by 4 mm. broad and of a white or reddish color. (See Bibl., Merrill, B.) Occurs in seams in Carolina gneiss in the stone quarries along Connecticut Avenue and along the upper Potomac River.

### 48. **Lignite.** Fossil Wood.

In excavations along ancient stream beds in various localities in the District. In shallow water of Cameron Run, Virginia and Northwest Branch, Md., as logs covered with marcasite incrustations. A concretion of marcasite after lignite was picked up in a railroad cut in Northeast Washington.

49. **Limonite.** Yellow Bog Iron. Yellow ocher.

In gravelly or sandy formations, or as yellow bog iron deposits, in numerous localities in the Coastal Plain from Brookland to Laurel, Maryland. Pseudomorphs of limonite in cubes after pyrite are a common occurrence

in the District. Limonite geodes, known as "rattleboxes" are found near Baltimore Stadium, Laurel and Beltsville, Md.

50. **Linnaeite.** Nickel cobalt pyrites.

In streaks with bornite and other copper minerals in chlorite schist at Mineral Hill and near Finksburg, Md.

51. **Magnetite.** Magnetic Iron.

In loose grains in river sand, as near Chain Bridge, Virginia. Langdale found magnetite associated with chlorite in this region. Was mined 1 mile S. E. and 2½ miles N. E. of Whitehall, Baltimore Co., Md.

52. **Malachite.** Green Copper Carbonate.

Malachite stains were seen on gabbro from the "Granite Quarry" at Falls Church, Virginia, and at the old copper mine on Goose Creek, Va.

53. **Marcasite.**

In incrustations possessing radiate or fibrous structure on lignite in bed of Cameron Run, Virginia, and along the Sligo and Northwest Branch, Md. A marcasite concretion (after lignite) was found in Northeast Washington (1st and M Streets).

54. **Melanterite.** Copperas.

This salt usually results from the decomposition and oxidation of pyrite or marcasite. As a rule, the substance being soluble in rain water, is removed as fast as formed. However, during the dry season of 1892 it accumulated in considerable quantities, forming thin crusts on the rocks. Observed on marcasite incrustations covering lignite on the bank of Cameron Run, Virginia, and as a crust on rock near Howard University in 1892.

55. **Microcline.**

Found, with orthoclase, in the granitic veins of the District, and hardly distinguishable except optically. Was mined near Woodstock, Granite and Hollofield in Baltimore Co., and 4 miles west of Laurel in Montgomery Co., Md.

56. **Microlite.**

A rare mineral found as an olive-green mass at the Kensington Mine, Md.

57. **Muscovite.** Potash Mica. Vars. Sericite, Zinnwaldite and Fuchsite.

Found commonly in the District as one of the essential constituents of granite, gneiss, mica schist and other related rocks, particularly in the Piedmont region. Muscovite granite is found as a dike on Cupid's Bower Island, near Great Falls, Maryland.

Var. Sericite, a fine scaly muscovite united in fibrous aggregates and characterized by its silky luster, occasionally occurs in the local schists. The green variety, Fuchsite, was found in Montgomery Co., Md.

Muscovite has been mined 5 miles N. E. of Laurel and 1½ miles N. of Scaggsville, as well as near Kensington (where the variety Zinnwaldite occurs) and Woodstock, all in Montgomery Co., Md.

58. **Natrolite.**

On prehnite in the Goose Creek Traprock Quarry near Leesburg, Virginia.

59. **Oligoclase.**

Found in granite and in serpentine in the District and Virginia.

60. **Opal.** Var. Diatomaceous Earth.

A massive piece of white opal, with brecciated quartz scattered through it, was found by the writer embedded in the clayey soil on Blagden Avenue near 16th Street, Northwest, in this city. A bed of diatomaceous earth 30 feet thick at base of the Miocene has been traced from Herring Bay on the Chesapeake to Pope's Creek on the Potomac across Anne Arundel, Calvert and Charles Counties, Md. A good outcrop is found at Lyons Creek on the Patuxent River.

61. **Orthoclase.** Potash Feldspar.

Abundant in the District as the common feldspar of granite veins and granitoid rocks. Often found loose as crystals or massive in the gravels and sands of Rock Creek.

62. **Penninite.** Chlorite, in part.

Associated with serpentine near Falls Church, Virginia. Reported from the Patuxent Bridge region in a quartz seam in granite.

63. **Piedmontite.** Manganese Epidote.

In pebbles of aporhyolite, probably water or ice-born, and derived from the Pen-Mar region, in the exposed Pleistocene gravels along Harvard Street leading to the National Zoo Park. Also in Indian artifacts as small elongated phenocrysts in aporhyolite.

64. **Pinite.**

In decomposed feldspathic granite, and in yellowish-gray squarish prisms up to about ½ cm. long, in altered aporhyolite in the Pleistocene gravels along Harvard Street and Adams Mill Road in Washington.

(To Be Continued)

## THE AMATEUR LAPIDARY

Conducted by J. H. HOWARD\*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

\*Author of—*The Working of Semi-Precious Stones, and Handbook for the Amateur Lapidary.*

### Mud Sawing

By WILLIAM J. BINGHAM

After having tried several systems of sawing agate nodules during the past two years, I have developed an apparatus which works satisfactorily for me and at the request of Mr. Howard I am describing it. The sketch of my layout is drawn accurately to the scale shown and the various parts are explained as follows:

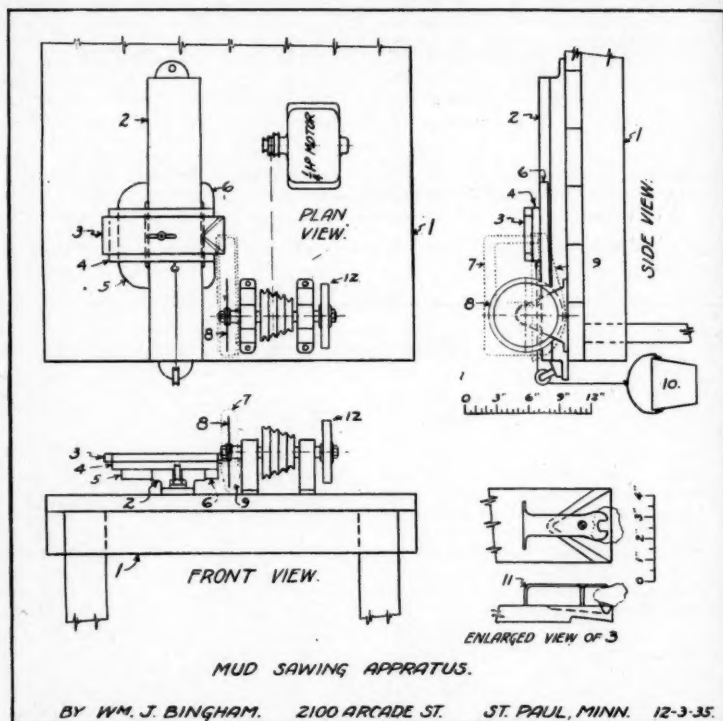
No. 1—Is the end of a good solid work bench; the other end of which is occupied by a small wooden lathe.

No. 2—Is a piece of cast iron from the junk yard and its past usage is unknown. This could be of any other shape, but the top surface should be smooth and true, and the edges smooth and parallel. It is important that this piece be very rigid and must be solidly fastened to the bench.

No. 3, 4, 5, 6, and 11—The carriage is made of wood and most any kind will do; although a hard wood is preferable. Do not use any wood with a resinous grain as it may become sticky and prevent the slide from working freely. The body (4) has the guides (5 and 6) solidly fastened to it with screws so that it will slide on (2) without any side play or wobbling. It should slide fairly freely but uniformly for several inches back and forth in the position that the sawing is done. No (3) is a flat piece of wood working on top of (4) and between two narrow wooden guide strips. It has a slotted hole in it and it is held down by a screw and washer.

This piece (3) carries the stone to be sawed, overhanging the end as shown in the enlarged view. The bottom is sloped down towards the end and grooves cut in the top so that the cutting compound will drain to the extreme end and drop off into the bottom splash pan (9) and be used over again. No (11) was a lawn mower wrench which was stamped and hardened. The temper was drawn and the large end bent 90 degrees to form the legs and the small end smoothed up so that the corners of the opening is square and sharp and then rehardened. A wooden screw near the small end furnishes the clamping power.

No. 8—Is the saw disk. I use 22 gauge galvanized iron 7 to 7½ inches in diameter and belt it to run approximately 600 R. P. M. The saw spindle is mounted in heavy bearing brackets with tight bearings and no end play. When a new disk is placed in service it is trued up in place by putting a piece of broken carborundum wheel in place of the stone to be cut; and running the disk dry. The stone is fed up to the disk. This will give a perfectly true disk to start with. The splash pan (9) and cover (7) are made of large tin oil cans (5 gal. in size). These usually can be obtained for nothing. The pan (9) is supported on the bearing bracket, and the cover (7) sets inside of (9) as shown. Be sure the outside lip of (9) is close enough to guide (6) so that the cutting compound



will drain into it. I allow approximately  $\frac{1}{4}$  to  $\frac{3}{8}$  inches clearance around the bottom of the disk to prevent the carborundum from settling out. Cover (7) has an oblong opening in the side for the stone being cut to project through. Several pieces of tin are used to catch any spatter and drain it back into the pan (9). These are cut and placed to suit the stone being cut.

For cutting I use No. 180 carborundum in light machine oil (S.A.E. No. 20). When this gets thick with stone dust it may be thinned with kerosene or distillate, but I prefer to throw it out and start with a new batch. I use approximately a half teaspoon of carborundum in enough oil to cover the wheel about one-half inch when standing still.

The pail (10) is for carrying weights for feeding the carriage and stone

against the saw. The connection is a heavy fish line over the pulley. I use weights from 1 to 5 lbs., with the length of cut from one-half to two inches. If the stone gets hot, too much pressure is being used. In starting a cut the carriage and stone are fed to the disk by hand very cautiously until the cut is about  $\frac{1}{32}$  of an inch deep or enough to prevent any tendency for the disk to run to one side or the other after which the pressure may be applied.

I have mounted my motor on a board about 10 inches by 12 inches by three-fourths inch thick, with a heavy nail in each corner projecting through the bottom about one-half inch and filed to a long sharp point. This may be moved anywhere on the bench and will stay put wherever placed.

My theory as to why this apparatus

does not develop flat spots on the disk is as follows: The weight of the stone and carriage is enough to prevent it from being bounced back and forth by

any irregularities of the disk and the friction between the carriage and bed tends to damp out any vibration that may tend to start.

## Bibliographical Notes

*The Fluorescence of Minerals:* By Chester B. Slawson. Mineralogical Laboratory, University of Michigan. Trustee of Cranbrook Institute of Science. Issued by Cranbrook Institute of Science, Bloomfield Hills, Mich., as Bull. No. 5, Dec. 1935, 15 pps., 1 colored plate, price 35c.

An excellent treatise on the fluorescence of min-

erals. The color plate, shown in the frontispiece is, as far as known, the first color plate ever published of fluorescent minerals. It was made at the Institute and shows a portion of the permanent exhibit. Every collector interested in fluorescent minerals should have a copy of this bulletin in his mineralogical library.

## Club and Society Notes

### Wyoming Valley Historical and Geological Society

Due to the repeated inquiries of the public, the Wyoming Valley Historical and Geological Society has re-opened its Anthracite Exhibit at the Special Exhibits Building, 78 South Franklin Street, Wilkes-Barre, Penn.

This exhibit, showing the numerous phases of the leading industry of the Valley, has, ever since its original installation, attracted much attention from visitors.

One of the most notable features is a particularly fine group of safety lamps, augmented as it has been by types lent by the Bureau of Mines at Washington. Another is the collection of fossilized plants and animals—tropical life that flourished in Pennsylvania ages ago. Though small this suite of fossils has been highly complimented by prominent authorities on paleobotany and paleontology here and abroad, both for its choice-ness, and its correct classification, largely the work of T. Hubbard Jones, its Curator.

Many photographs of old and modern breakers aids one to visualize the improvements made in the mode of preparing anthracite for market.

One looks, with wonder, at contour map of the buried valley of the Susquehanna, illustrating the effect of the river on the general formation of this section through the various geological periods. Here also is a most interesting glass model of the principal veins of anthracite, in all their variations of depth.

Perhaps the most outstanding and certainly the unique feature of the Exhibit is the grate used by Judge Fell many years ago to prove to his friends and the world the virtues of anthracite coal as a domestic fuel.

Open Tuesday to Saturday from 2 to 5 P. M. and Saturday morning from 10 to 12, the exhibit should be seen by all.

JOHN J. S. SHRADER

### Mineralogical Society of Arizona

A meeting was held December 4th, at the Arizona Museum in Phoenix, Arizona to discuss plans for a mineralogical society, sponsored by the Museum Board. Two weeks later, December 18th the Mineralogical Society of Arizona was launched, at a well attended meeting in the Museum. A Constitution and By-laws were adopted, and officers were elected. Those who will direct the Society for the first year are:

President—A. L. Flaggs

Vice-President—Luther Steward

Board of Governors—Luther Steward, H. B. Holloway, Claude E. McLean, Dr. John A. Lentz, Albert S. Wood, Miss Lucy Faherty, Arthur Webber, J. R. McDonald, Miss Margaret Bertino, C. E. Young, Miss Anne Alkire, J. R. Elliott, Banjaman J. Webber, George Stewart.

At the close of the first regular meeting, Mr. Luther Steward spoke on "Some Arizona Mineral Localities."

The Society plans to hold regular meetings at the Arizona Museum on the 1st and 3rd Thursday of each month. A number of qualified speakers are available and an interesting series of programs for the season is contemplated. Later, field trips will be arranged.

Arizona is rich in localities from which interesting material can be collected. Within a radius of twenty-five miles of the city of Phoenix are collecting localities but little known generally. In more remote localities many showy specimens are to be found in mines and mine dumps.

## A PEEK AT OUR MAIL

### Good For You!

Orange, Mass.—I am sending in my renewal for another year as I do not wish to be left out of the party for even a month. ROCKS and MINERALS is read, filed, referred to, and re-read many times at the house—Good Luck!

Hugh M. Albee.

### Pleased With Advertisers

Clair, Sask., Canada—I wish to call your attention to the non-arrival of ROCKS and MINERALS for November; I do not want to miss even one copy. I look forward from one month to the next for the arrival of this fine little magazine and I am lost if it does not arrive when I think it should.

The more I study mineralogy, the more I take out my back numbers of ROCKS and MINERALS to read them over. I soon learn on re-reading that a number of ideas, brought out by the various writers, were missed and the more I re-read the magazines, the more I realize how little I know about mineralogy.

I obtained recently a very interesting handbook from the Porter Chemical Co., Hagerstown, Md., and can recommend this book to all beginners at the game. The book is well worth the \$1.00 asked for it. I must also put in a good word for Green's Agate Shop, Bend, Oregon; there is nothing stingy about those birds as a person doesn't need a microscope to see their specimens. It is a pleasure to do business with these and other dealers advertising in ROCKS and MINERALS.

J. H. Terrex.

### A Rocks and Minerals Booster

Winona, Minn.—Enclosed find \$2.00 in cash for which renew my subscription to good old ROCKS and MINERALS and also send one sample copy of the January number to each of the following: Winona Public Library, Senior High School Library (Winona) and St. Mary's College Library (Winona).

Best I can do as people around here consider a "rock hound" "tached in the haid," but the above samples will reach many who might become ENLIGHTENED.

R. R. Loppnow.

### Yes, Quite a Task

Salt Lake City, Utah.—I think you have done a wonderful job on the magazine, considering your limited resources, and the almost impossible task of holding on while you got it introduced.

J. J. Hayes.

### We Agree With You

Woodhaven, N. Y.—It is with great pleasure that I look forward to another interesting year with ROCKS and MINERALS. Your articles are extremely interesting and I see no reason why any collector should be without it.—Harry Vogt.

### Good Things Come In Small Packages

West Hartford, Conn.—Although ROCKS and MINERALS is small, it contains a lot more than is revealed by the size of its cover.

A. Martin Hillery.

## Acknowledgments

We wish to acknowledge receipt and express our sincere thanks for specimens and other donations recently sent us by some of our subscribers.

**Bourne, C. L. C.**, Georgetown, British Guiana, a copy of **The Chronicle Christmas Annual**; British Guiana's most interesting magazine.

**Chandler, H. L.**, No. Springfield, Vt., three interesting minerals from Vermont and New Hampshire.

**Hollister, W. J.**, Little Falls, N. Y., a number of dainty rock crystals (Herkimer County diamonds) from his vicinity.

**Kitson, John**, Easthampton, Mass., 8

pictures of fossil footprints (dinosaurs). The footprints were found by him, at a locality not far from Easthampton, and are only a small fraction of his very extensive collection of them.

**New Jersey Mineral Exchange**, Paterson, N. J., a beautiful polished specimen of agate from Prospect Park trap-rock quarry, near Paterson.

**Schmidt Co., Inc.**, Wm. V., a large calendar containing useful tables and information on precious and semi-precious stones.

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